



# New data on the distribution of *Oxychilus uziellii* (Issel, 1872) (Pulmonata, Zonitidae) with a redescription of the species

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**KEY WORDS:** Gastropoda, Pulmonata, Zonitidae, *Oxychilus*, *O. uziellii* (Issel, 1872), redescription, taxonomy, nomenclature, distribution, conservation, Italy.

**ABSTRACT:** *Oxychilus uziellii* (Issel, 1872) belongs to *Oxychilus* (s.str.) sensu Giusti & Manganelli (1999), a "subgenus" of *Oxychilus* characterized by: penis with flagellum (1); penial retractor inserted at apex of flagellum (2); epiphallus usually longer than proximal penis, its internal wall with slender longitudinal pleats (3); mucous gland mainly vaginal (4); long mesocone of central tooth (5). It is distinguished from all the other *Oxychilus* (s.str.) species by virtue of its medium-sized shell (shell diameter:  $11.1 \pm 0.7$  mm), yellowish, subdiscoidal, flat below, with subtriangular aperture, funnel-shaped umbilicus and last whorl slightly angled at base; it is anatomically characterized by the peculiarly developed penial flagellum (1), the reduced proximal penis (about 1/3 of distal penis) (2) and by the internal ornamentation of flagellum and proximal penis consisting of system of transverse pleats converging towards longitudinal double cordon opposite opening of epiphallus into penis (3). *O. uziellii* has a reduced distribution limited to central southern Tuscany and some scattered localities of the Tuscan Emilian Apennine and Emilian hills. During the 1990s many new records have made it possible to define the distribution in central southern Tuscany more exactly. In addition, study of the type material of *Hyalina uziellii* var. *genei* Westerlund, 1887, has shown that this nominal taxon is a junior synonym of *O. uziellii*.

**RIASSUNTO:** *Oxychilus uziellii* (Issel, 1872) appartiene ad *Oxychilus* (s.str.) sensu Giusti & Manganelli (1999), un "sottogenere" di *Oxychilus* caratterizzato da: presenza del flagello peniale (1); retrattore peniale inserito all'apice del flagello (2); epifallo generalmente più lungo del pene prossimale e con le pareti interne percorse solo da esili pliche longitudinali (3); ghiandola mucosa per lo più vaginale (4); dente centrale della radula con lungo mesocono (5). Si riconosce per la conchiglia di medie dimensioni (diametro:  $11.1 \pm 0.7$  mm), subdiscoidale, color giallognolo, piatta sotto, con apertura discendente subtriangolare, ombelico imbutiforme ed ultimo giro leggermente angolato alla base; anatomicamente è inconfondibile per avere il flagello peniale molto sviluppato (1), il pene prossimale ridotto (circa 1/3 del pene distale) (2) e un'ornamentazione interna del flagello e del pene prossimale formata da un sistema di pliche trasversali convergenti verso un doppio cordone longitudinale, situato sul versante opposto all'apertura dell'epifallo nel pene (3). *O. uziellii* ha una distribuzione ridotta, circoscritta alla Toscana centromeridionale e ad alcune località dell'Appennino toscano e delle colline bolognesi. Nel corso degli anni '90 sono stati raccolti molti nuovi dati che hanno permesso di delineare accuratamente la sua distribuzione in Toscana centromeridionale. Inoltre, è stato esaminato il materiale tipico di *Hyalina uziellii* var. *genei* Westerlund, 1887, accertando come questa entità sia un più giovane sinonimo di *O. uziellii*.

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## INTRODUCTION

Tuscany is very rich in *Oxychilus* species. There are three species endemic to the Tuscan Archipelago: *O. majori* (Paulucci, 1886), *O. oglasicola* Giusti, 1968, and *O. pilula* (Paulucci, 1886), two quasi-endemic to Tuscany: *O. meridionalis* (Paulucci, 1881) and *O. uziellii* (Issel, 1872) and, finally, three non-endemic species: *O. clarus* (Held, 1838), *O. draparnaudi* (Beck, 1837), and *O. bydatinus* (Rossmässler, 1837) (two other species pending further study: *O. igilicus* Giusti, 1968, and *O. lanzai* Forcart, 1967) (MANGANELLI *et al.*, 1995, 1999; GIUSTI *et al.*, 1999; personal unpublished data).

Although it is one of the most characterized, *O. uziellii* was overlooked and misinterpreted until the revision by MANGANELLI & GIUSTI (1985). This species, first regarded as endemic to Tuscany, south of the Arno River, was later also found in scattered localities north of the Arno River and the Po River side of the central northern Apennine (MANGANELLI & GIUSTI, 1993). In recent years many records have been collected which have enabled its Tuscan distribution to be more accurately defined. On the contrary, its distribution in Emilia-Romagna is

still relatively unknown. We took the opportunity to redescribe *O. uziellii* on the basis of all the material presently available.

## *Oxychilus* (s.str.) *uziellii* (Issel, 1872)

Fauna d'Italia code number: 16.085.0.014.0.

*Zonites Uziellii* ISSEL 1872: 60-61.

Type material: the lectotype and one paralectotype (Manganelli & Giusti, 1985: Fig. 3 A-B) are in the Paulucci collection, Museo Zoologico de "La Specola", Sezione del Museo di Storia Naturale dell'Università di Firenze (MZUF no. 689).

Type locality: "Fra i detriti del Gombo, presso Pisa".  
*Hyalina uziellii* var. *genei* "Pollon. in sc." WESTERLUND, 1887: 4.

Type material: the lectotype (Fig. 12) is in the Pollonera collection at the Museo Regionale di Scienze Naturali (Turin, Italy) (MZUT no. 122.1).

Type locality: "Sardinien".



Figs. 1-5. Shells of *Oxychilus uziellii* (Issel, 1872) from Fosso delle Filicaie, Le Muline (Gaiole - Radda in Chianti, Siena), 32TPP9115, G. Manganelli leg. 30.4.83 (1), Rio Basino (Riolo Terme - Brisighella, Ravenna), 33TQQ1403, G. Lazzari leg. 1.5.85 (2), Casetta di Tiaria, 550 m asl (Firenzuola, Firenze), 32TPP9485, I. Scali leg. 15.8.89 (3), Debris of Fosso Fusola, Monterosi (Monteroni d'Arbia, Siena), 32TPN9187, L. Favilli & G. Manganelli leg. 5.3.90 (4), Provincial Road to Montemassi, turnoff for C. Malossi (Montieri, Grosseto), 32TPN6569, G. Manganelli & L. Manganelli leg. 21.6.92. (5).

## IDENTIFICATION

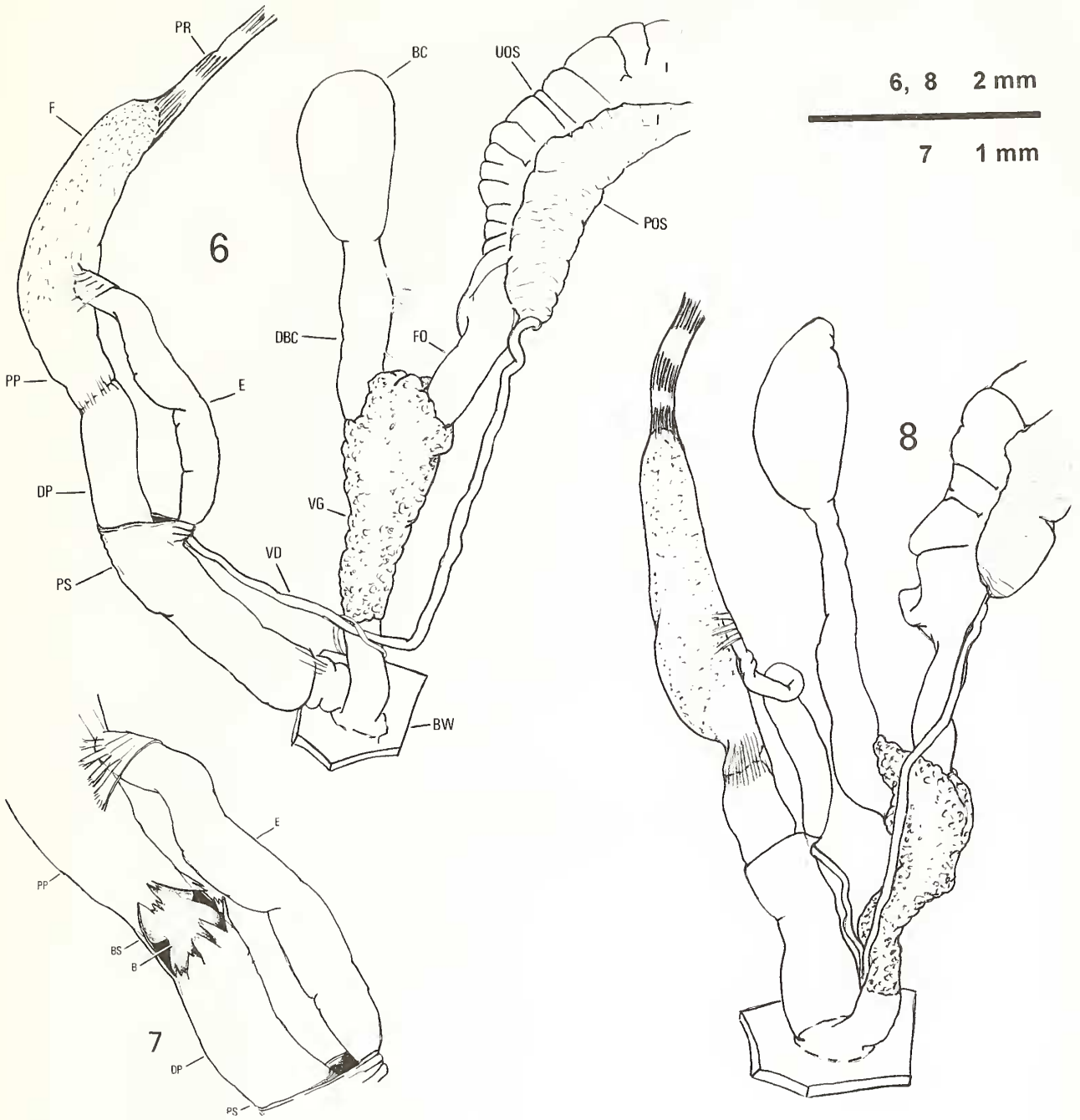
A medium-sized species of *Oxychilus* (s.str.) sensu GIUSTI & MANGANELLI (1999) with shell subdiscoidal, flat below, yellowish, with about 5 1/2-6 1/4 regularly growing whorls, subtriangular aperture and funnel-shaped umbilicus; anatomically characterized with respect to all the other species by the peculiarly developed penial flagellum (1), reduced proximal penis (about 1/3 of distal penis) (2) and internal ornamentation of flagellum and proximal penis consisting of system of transverse pleats converging towards a longitudinal double pleat opposite

opening of epiphallus of into penis (3).

## DESCRIPTION

Body (GIUSTI *et al.*, 1993: Fig. 61) slate-blue in colour; neck and upper part of sides with variably wide areas with conspicuous pits (with phylacites); mantle collar margin strongly angled near anus and pneumostome; foot slender, aulacopod, pale slate-grey, sole longitudinally tripartite; kidney sigmurethrous; jaw oxygnathous.

Shell (Figs. 1-5; MANGANELLI & GIUSTI, 1985: Figs. 3 A-



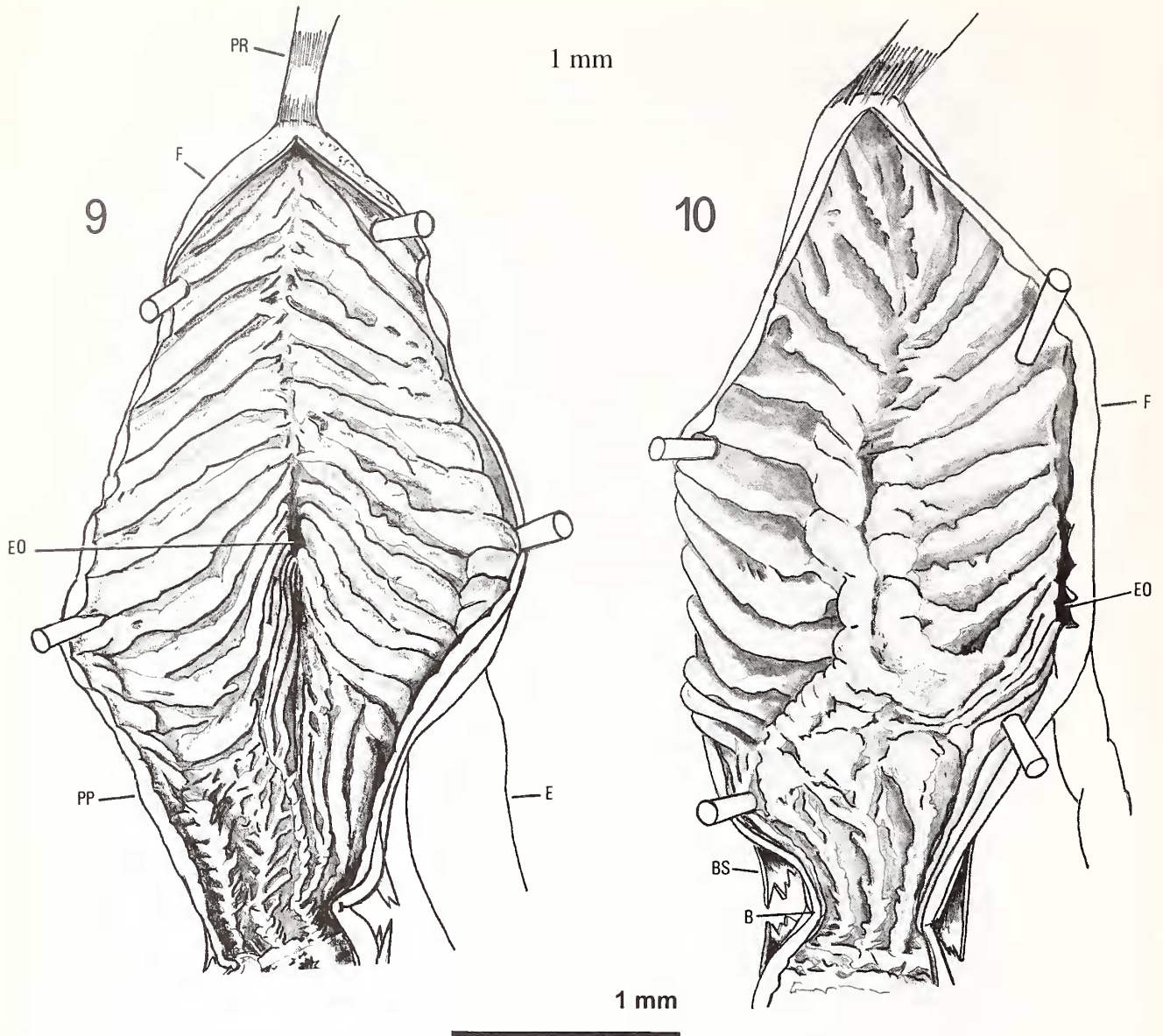
Figs. 6-8. Distal genitalia (Figs. 6, 8) and mid penis region (Fig. 7) in specimens of *Oxychilus uziellii* (Issel, 1872) from Torrente Rosia, Podere Molinaccio (Sovicille-Casole d'Elsa, Siena), 32TPN7690, L. Favilli & G. Manganelli leg. 21.3.90 (Figs. 6-7) and San Gimignano, Le Fonti (San Gimignano, Siena), 32TPP6515, G. Manganelli leg. 28.12.83 (Fig. 8).

Key to the acronyms used in Figs. 5-10: B "bottle-neck", BC bursa copulatrix, BS "bottle-neck" sheath, BW body wall, DBC duct of bursa copulatrix, DP distal portion of penis, E epiphallus, EO epiphallus opening, F flagellum, FO free oviduct, P penis, POS prostatic portion of ovispermiduct, PP proximal portion of penis, PR penial retractor, PS penial sheath, UOS uterine portion of ovispermiduct, VD vas deferens, VG vaginal gland.

B, D-F, 4 A-D; MANGANELLI & GIUSTI, 1993: Fig. 7) dextral, medium-sized, discoidal, tectiform, pagodiform or occasionally flat above, rather flat below, thin and fragile, subtransparent, variably glossy, yellowish to pale brownish yellow, sometimes

with thin and paler spiral bands, opalescent below; external surface with variably evident growth lines and microsculpture consisting of very fine wavy spiral lines; spire of 5 1/2 - 6 1/3 slowly and regularly growing whorls, last whorl slightly dila-





Figs. 9-10. Two different views (opposite sides) of the internal ornamentation of flagellum and proximal penis in specimens of *Oxychilus uziellii* (Issel, 1872) from Torrente Rosia, Podere Molinaccio (Sovicille-Casole d'Elsa, Siena), 32TPN7690, L. Favilli & G. Manganelli leg. 21.3.90 (Fig. 9) and San Gimignano, Le Fonti (San Gimignano, Siena), 32TPP6515, G. Manganelli leg. 28.12.83 (Fig. 10).

red, variably descending, usually slightly angled at base, its terminal portion frequently displaced downward; sutures deep; umbilicus wide, funnel-shaped, about  $1/4 - 1/5$  of shell maximum diameter; aperture subtriangular to oval, oblique, frequently displaced downwards; peristome interrupted, simple, with a wavy outline, slightly thickened in well adult specimens, not reflected, its upper vertex starting above periphery of last whorl.

Dimensions (41 shells measured). Number of whorls:  $5 \frac{6}{7} \pm 1/5$  ( $5 \frac{1}{2} - 6 \frac{1}{3}$ ); shell diameter:  $11.1 \pm 0.7$  mm ( $9.8 - 12.5$ ); umbilicus diameter:  $2.4 \pm 0.2$  mm ( $1.9 - 2.9$ ); height:  $4.5 \pm 0.4$  mm ( $3.4 - 5.6$ ).

Genitalia (Figs. 6-10; MANGANELLI & GIUSTI, 1985: Figs. 1 A-D, 2 A-C; MANGANELLI & GIUSTI, 1993: Figs. 4-5). General scheme of genitalia as in *Oxychilus* (s.str.) sensu GIUSTI & MANGANELLI (1999). Only distal genitalia are described here. Female genitalia include free oviduct, bursa copulatrix and its duct and vagina. Distal portion of duct of bursa copulatrix and most of the length of vagina enveloped by variably large muff of spongy glandular tissue forming vaginal mucous gland; duct of bursa copulatrix variably long (2.1 - 4.2 mm; n: 2), initially moderately flared, narrowing slightly immediately before entering oval or pyriform bursa copulatrix; distal vagina free of vaginal gland very short (1.0 - 1.3 mm; n: 2), reducing in cali-



bre near genital atrium.

Male distal genitalia include vas deferens, epiphallus, and penial complex (flagellum and penis). Epiphallus rather long (4.9 - 4.6 mm; n: 2) and slender, its internal walls bearing series of very slender longitudinal pleats. Flagellum large and long (2.5 - 3.0 mm; n: 2), with penial retractor muscle ending at apex. Penis divided into proximal and distal portions by constriction enveloped externally by very thin transparent sheath; soon before constriction, terminal part of proximal penis tapers more or less abruptly to form very short but wide "bottle-neck" at end of which distal penis begins. Border between bottle-neck and distal penis demarcated internally by small, not very prominent, wrinkled annular crest. Internal ornamentation of flagellum consisting of large pleats radiating from a sulcus which runs from epiphallus opening to flagellum tip; central-upper transverse pleats end on opposite side of flagellum where they give rise to a kind of longitudinal double cordon. Proximal penis reduced, short (1.9 - 2.1 mm; n: 2), its internal ornamentation consisting of series of variably evident, wavy, branched, longitudinal pleats. Part of wall of flagellum and proximal penis is filled with spongy glandular tissue. Distal penis variably long (3.9 - 5.3 mm; n: 2), cylindrical, wide, with internal ornamentation consisting of longitudinal pleats, some larger,

more prominent and with jagged sides. Penial sheath enveloping distal penis rather long (2.7 - 3.3 mm; n: 2), traversed on one side by vas deferens. Very short, thin walled duct connects distal penis (level with where penial sheath originates) to genital atrium in which vagina also ends.

Radula (MANGANELLI & GIUSTI, 1985: Fig. 5 A-C) consisting of many rows of about 31-33 teeth, according to the formula: 12-13 M/1 + 1 LM/2 + 2 L/3 + C/3 + 2 L/3 + 1 LM/2 + 12-13 M/1. Central teeth with well developed basal plate, apical portion of which V-like, with pointed vertices; body of tooth wide, providing base for rather long, slender, pointed mesocone flanked by two very short ectocones. On both sides of each central tooth two lateral tricuspid teeth, a latero-marginal bicuspid tooth and series of monocuspid marginal teeth in decreasing order of size.

### Type material

Issel (1872: 61) stated that he knew only three specimens of this species collected by his friend Vittorio Uzielli. When we embarked on the revision of this species in the early 1980s, we looked for these syntypes at the Museo Civico di Storia Naturale of Genoa (Italy) where, according to the late Dr. Felice Capra (personal communication), Issel's collection was kept. Because

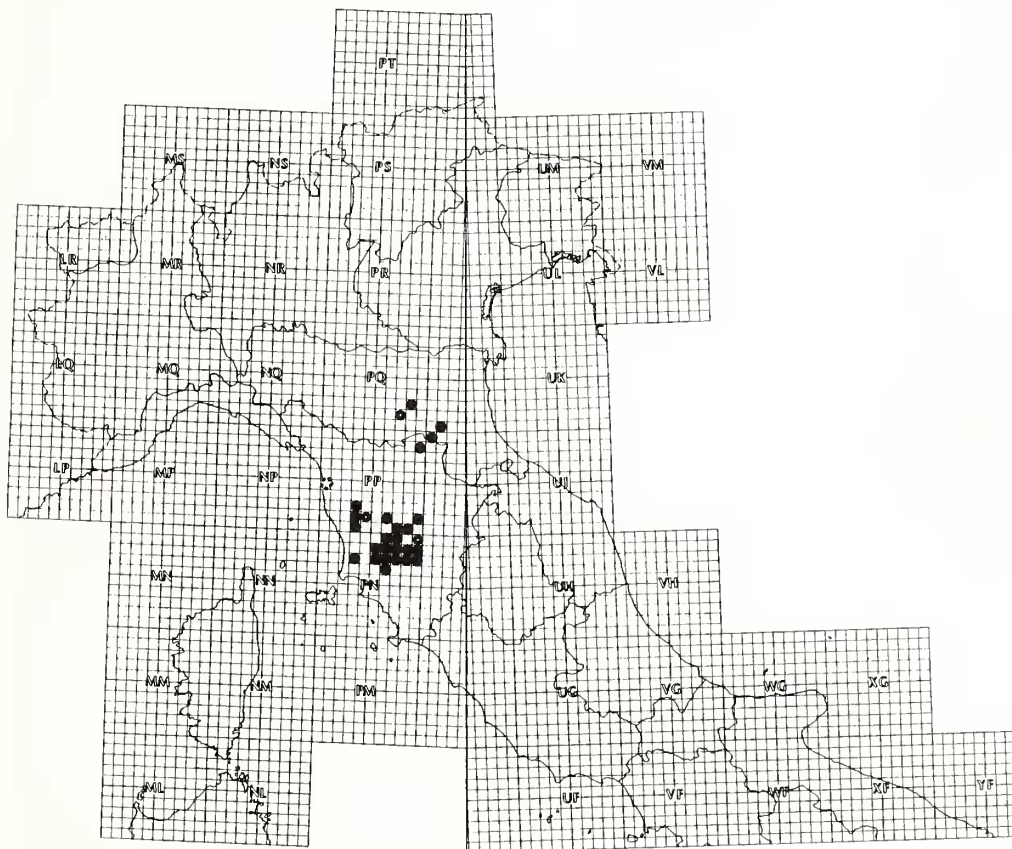


Fig. 11. The distribution of *Oxychilus uziellii* (Issel, 1872) on UTM map (10 x 10 km squares) in central-northern Italy, based on recent records. Full dot: live specimens or shells in debris originating inside the square; empty dots: shells in debris which might have originated outside the square; star: the type locality.



Fig. 12. The lectotype of *Hyalina uziellii* var. *genei* Westerlund, 1887, from "Sardegna ?" and its original label. Pollonera collection, Museo Regionale di Scienze Naturali (Turin, Italy), MZUT no. 122.1.

no type material was traced in this museum, we considered two specimens in Paulucci's collection at the Museo Zoologico de

"La Specola", Sezione del Museo di Storia Naturale dell'Università di Firenze (MZUF 689) for the type designation. They were





received from V. Uzielli and regarded as syntypes by FORCART (1967: 115, 116). We treated them as syntypes on behalf of PAULUCCI (1879: 166) who claimed to have determined her specimens comparing them with the type material received from V. Uzielli and we designated one of them as lectotype (MANGANELLI & GIUSTI, 1985: Fig. 3 A-C). However, it is not absolutely certain that this material was really original and not other material subsequently collected by V. Uzielli. In fact like many authors of that period, Paulucci often used the word “type” and “typical” not to denote specimens with type status in the current sense, but only in the sense that they matched the type material morphologically.

Recently, F. Barbagli of the Centro Interdipartimentale di Servizi “Musei Universitari” (Università degli Studi di Pavia) traced Issel’s collection of the European non marine molluscs in the University of Pavia. In fact Issel presented his collection of marine and non marine extra-European molluscs to the Museum of Genoa and subsequently sold the collection of non marine European molluscs to the Museum of Pavia. Unfortunately the collection (originally with 18,000-20,000 specimens) is currently inaccessible (F. Barbagli, personal communication 3.12.1998).

### Type locality

The type material was collected in debris of the Arno River, along the marine coast near Gombo, near Pisa. As PAULUCCI (1879) stated, this site is where river debris are deposited. Judging from the distribution, the locality inhabited by the species closest to the mouth of the Arno is Val d’Era. The specimens from the Val d’Era sometimes have wider last whorls like the type material (on the contrary, specimens from inland Tuscany always have a narrower last whorl). It therefore seems likely that the material collected in the type locality was from Val d’Era.

### Material examined

The material examined is listed as follows: locality, municipality and province names in parenthesis, UTM reference, collector(s), date, number of specimens (if the material has been sorted) and bibliographical reference, in parenthesis if they are voucher specimens. Locality names and UTM references are according to the official 1:25,000 scale map of Italy (series M 891). Unless otherwise indicated, all the material examined is kept in the Giusti Collection (Dipartimento di Biologia Evolutiva, Via Mattioli 4, I-53100 Siena, Italy).

Acronyms. Collectors: BL B. Lanza, CC C. Caroti, CF C. Finetti, GM G. Manganelli, GL G. Lazzari, IS I. Scali, LF L. Favilli, LM L. Manganelli, MB M. Bodon, MBz M. Brezzi, MC M. Calcagno, MP M. Paulucci, MT M. Taviani, SB S. Bonelli, SBr S. Brogi, SC S. Cianfanelli, VU V. Uzielli. Provinces: BO Bologna, FI Firenze, GR Grosseto, LI Livorno, PI Pisa, RA Ravenna, SI Siena. Materials: sh shell/s, sp spirit specimen/s. Museum and private collections: MCZR Museo Civico di Zoologia, Via Aldrovandi 18, 00197 Roma, Italy, MZAFS Museo Zoologico dell’Accademia dei Fisiocritici, Piazza Sant’Agostino 4, 53100 Siena, Italy, MZUF, Museo Zoologico “La Specola”, Sezione del Museo di Storia Naturale dell’Università di Firenze,

Via Romana 17, 50125 Firenze, Italy, SCC S. Cianfanelli Collection, P.le Porta Romana 13, 50125 Firenze, Italy.

Historical material examined – Nei detriti dell’Arbia [in debris of Arbia river], SB leg. autumn 1872 (6 sh det. *Hyalinia villae* by BONELLI (1873: 403); MZAFS; MANGANELLI & GIUSTI (1985)). Detriti del Gombo presso Pisa [in debris of Arno river at Gombo, near Pisa], VU leg. (2 sh, one of which designated as lectotype and the other as paralectotype, Paulucci collection, MZUF 689 (lectotype), 11521 (paralectotype); MANGANELLI & GIUSTI (1985)). Detriti del Gombo [debris of Arno river at Gombo], MP leg. 1877 (4 sh, Paulucci collection, MZUF 693; MANGANELLI & GIUSTI (1985)). Bocca d’Arno a 12 km da Pisa [Mouth of Arno river 12 km from Pisa], CC & MP leg. 12.3.1877 (22 sh, Paulucci collection, MZUF 825). Le Fonti, San Gimignano, MP leg. 10.1879 (10 sh, Paulucci collection, MZUF 692; MANGANELLI & GIUSTI (1985)). San Gimignano, MP leg. 10.1879 (9 sh, Paulucci collection, MZUF 775; 9 sh, Paulucci collection, MZUF 776; 8 sh, Paulucci collection, MZUF 11522; 7 sh, Paulucci collection, MZUF 11524). Le Fonti [San Gimignano], MP leg. (15 sh, Monterosato collection, MCZR; MANGANELLI & GIUSTI (1985)). Colle Val d’Elsa, MP leg. (2 sh, Monterosato collection, MCZR; MANGANELLI & GIUSTI (1985)). Dintorni di Siena [Siena area], SBr leg. 8.7.1879 (1 sh, Paulucci collection, MZUF 826).

Recent material examined – Tuscany: PN37) Monte Calvi, 500-600 m asl (San Vincenzo-Campiglia Marittima, LI), 32TPN3172, MC, SC, GM & LM leg. 21.12.97 (8 sh; SCC). PN57) Debris of Fosso Ritorto, Ponte Ritorto (Massa Marittima, GR), 32TPN5674, GM & LM leg. 21.10.96. State Road 439, Km 146.3 (Monterotondo Marittimo, GR), 32TPN5676, GM & LM leg. 12.1.97. PN58) Debris of Torrente Pavone, Casa Vecchia (Castelnuovo Val di Cecina-Pomarance, PI), 32TPN5685, GM & LM leg. 12.1.97. PN66) Debris of Rio Farmicciola, downstream from Botro Secco (Montieri, GR), 32TPN6668, GM & LM leg. 2.11.96. Provincial road to Montemassi, turnoff for C. Malossi (Montieri, GR), 32TPN6569, GM & LM leg. 21.6.92. PN67) Gerfalco, (Montieri, GR), 32TPN6179, CF & GM leg. 17.5.83 (3 sp; Manganelli & Giusti (1985)). Debris of Fiume Merse, Il Gabellino (Montieri, GR), 32TPN6471, GM leg. 16.2.91. Debris of Fiume Merse, Mulino di Trogoli (Montieri, GR), 32TPN6776, LF & GM leg. 25.8.91. Debris of Fiume Merse, Mulino di Trogoli, (Montieri, GR), 32TPN6776, LF & GM leg. 2.12.92. Mine access road to Pozzo Ballarino, turnoff for Romiccioni (Montieri, GR), 32TPN6570, GM leg. 16.2.91. PN68) Debris of Botro Rancia, at confluence with Fosso Quartino (Radicondoli, SI), 32TPN6786, GM & LM leg. 7.11.92. Debris of Fiume Cecina, Bagni delle Gallerie (Radicondoli, SI), 32TPN6484, GM leg. 14.6.92. Debris of Fiume Cecina, Ponte di Cecina (Radicondoli, SI), 32TPN6388, GM leg. 7.11.92. Debris of Torrente Saio (Chiusdino, SI), 32TPN6983, GM leg. 14.6.92. PN69) Pian di Cecina (Radicondoli, SI), 32TPN6095, GM leg. 24.3.95. PN77) Torrente Farma, bridge at 33 km post of State Road 73 “Senese-Aretina” (Monticiano, SI), 32TPN7472, LF, GM & LM leg. 2.12.92. PN78) Debris of Fosso La Gallesca, bridge on State Road 441 “Massetana” (Chiusdino, SI), 32TPN7480, LF &



GM leg. 29.8.91. Debris of Fosso Ritichiano, bridge at 49-50 km post of State Road 73 "Senese-Aretina" (Chiusdino, SI), 32TPN7482 LF & GM leg. 2.12.92. Debris of Torrente Feccia, bridge at 51-52 km post of State Road 73 "Senese Aretina" (Chiusdino, SI), 32TPN7484, GM leg. 3.3.90. Debris of Torrente Rosia, Ponte della Pia (Sovicille, SI), 32TPN7889, GM leg. 14.3.82 (5 sh; MANGANELLI & GIUSTI (1985)), GM leg. 9.3.83 (12 sh; MANGANELLI & GIUSTI (1985)). **PN79** Torrente Rosia, Podere Molinaccio (Sovicille-Casole d'Elsa, SI), 32TPN7690, LF & GM leg. 21.3.90. **PN87** Carpineta (Monticiano, SI), 32TPN8372, GM leg. 27.12.82 (6 sh; Manganelli & Giusti (1985)). Debris of Torrente Farma, Bagni di Petriolo (Monticiano, SI), 32TPN8672, LF, GM & LM leg. 8.3.92. **PN88** Castello di Capraia (Sovicille, SI), 32TPN8484, LF leg. 14.4.90. Fornacino (Sovicille, SI), 32TPN8482, LF & GM leg. 26.1.92 (GIUSTI *et al.*, 1993). Debris of Fiume Merse, Castello di Capraia (Sovicille, SI), 32TPN8484, LF leg. 14.4.90. **PN97** Debris of Fosso Sata, Podere La Pieve (Murlo, SI), 32TPN9276, GM & LM leg. 7.4.96. **PN98** Debris of Fosso Fusola, Monterosi (Monteroni d'Arbia, SI), 32TPN9187, LF & GM leg. 5.3.90 (2 sh; MANGANELLI & GIUSTI (1993)). Debris of Fosso Fusola, Monterosi (Monteroni d'Arbia, SI), 32TPN9187, LF & GM leg. 5.92. **PN99** Debris of Torrente Bozzone, Il Tinaio (Siena, SI), 32TPN9398, LF leg. 4.3.90. **PP30** Debris of Torrente Sterza, upstream of Torrente Noce (Chianni - Riparbella, PI), 32TPP3209, MB, SC & ET leg. 17.4.94 (7 sh; SCC). **PP31** Debris of Torrente Sterza, upstream of Ponte dello Sterza (Terricciola - Laiatico, PI), 32TPP3917, SC & ET leg. 9.1.94 (8 sh; SCC). **PP32** Debris of Fiume Era, Capannoli (Capannoli - Peccioli, PI), 32TPP3626, MC & SC leg. 7.2.93 (1 sp, 64 sh; SCC). Debris of Fiume Era, Le Piagge (Terricciola - Peccioli, PI), 32TPP3822, MC & SC leg. 19.12.93 (54 sh; SCC). Debris of Fiume Era, at confluence with Torrente Sterza (Laiatico - Terricciola, PI), 32TPP3920, MC & SC leg. 19.12.93 (8 sh; SCC). Debris of Fiume Era, Mulino Ripabianca (Terricciola - Peccioli, PI), 32TPP3920, MC & SC leg. 19.12.93 (82 sh; SCC). **PP41** Debris of Fiume Era, Fattoria di Spedaletto (Volterra, PI), 32TPP4513, SC & ET leg. 9.1.94 (95 sh; SCC). **PP61** San Gimignano, Le Fonti (San Gimignano, SI), 32TPP6515, GM leg. 28.12.83 (4 sp; MANGANELLI & GIUSTI (1985)). **PP70** Buca del Chiostraccio, no. 364 T/SI (Monteriggioni, SI), 32TPP7704, collector unknown 29.7.66 (1 sh; MANGANELLI & GIUSTI (1985)). Debris of Botro del Castagneto, between Abbazia Isola and Strove (Monteriggioni, SI), 32TPP7706, MBz & GM leg. 24.11.92. Debris of a gully near Abbazia Isola (Monteriggioni, SI), 32TPP7706, MBz & GM leg. 24.11.92. **PP80** Buca dell'Istrice, no. 182 T/SI (Monteriggioni, SI), 32TPP8005, BL leg. 21.2.54 (1 sh det. *O. obscuratus* by FORCART (1968), MZUF 388; MANGANELLI & GIUSTI (1985)). Querceto (Monteriggioni, SI), 32TPP8102, LF leg. 12.5.90. **PP90** Debris of Torrente Arbia, Pianella (Castelnuovo Berardenga-Siena, SI), 32TPP9603, GM leg. 4.82 (2 sh; MANGANELLI & GIUSTI (1985)). Debris of Torrente Arbia, at confluence with Torrente Massellone (Castelnuovo Berardenga-Gaiole in Chianti, SI), 32TPP9409, GM leg. 1.3.82 (11 sh; MANGANELLI & GIUSTI (1985)). **PP91** Fosso delle Filicaie, Le Muline (Gaiole

- Radda in Chianti, SI), 32TPP9115, GM leg. 30.4.83. Fosso delle Filicaie, San Giusto in Salcio (Gaiole - Radda in Chianti, SI), 32TPP9115, GM leg. 16.4.90. Fosso delle Filicaie, San Giusto in Salcio (Gaiole - Radda in Chianti, SI), 32TPP9115, GM leg. 30.4.83 (MANGANELLI & GIUSTI (1985)). Debris of Fosso delle Filicaie, San Giusto in Salcio (Gaiole - Radda in Chianti, SI), 32TPP9115, GM leg. 20.1.91. Debris of Fosso delle Filicaie, San Giusto in Salcio (Gaiole - Radda in Chianti, SI), 32TPP9115, LF & GM leg. 28.11.92. Torrente Arbia, Camporennuzzi (Gaiole - Radda in Chianti, SI), 32TPP9013, GM leg. 30.4.83. **PP98** Casetta di Tiaria, 550 m asl (Firenzuola, FI), 32TPP9485, IS leg. 15.8.89 (4 sh; MANGANELLI & GIUSTI (1993)). **Emilia Romagna: PQ71** Debris of Fiume Reno, Lama di Reno (Marzabotto, BO), 32TPQ71, MB leg. 2.11.91 (1 sh). **PQ82** Rastignano (Pianoro, BO), 32TPQ82, MT leg. 23.1.77 (1 sh). **QP09** Fiume Santerno, Castel del Rio (Castel del Rio, BO), 32TPQ09, MC & SC leg. 5.11.95 (8 sp, 4 sh; SCC). **QQ10** Rio Basino (Riolo Terme - Brisighella, RA), 32TPQ1403, GL leg. 4.84 (5 sh), GL leg. 1.5.85 (4 sp; MANGANELLI & GIUSTI, 1993).

## Etymology

The species was named after Vittorio Uzielli, who collected the original material. As far as we know no biographical sketch of V. Uzielli is available. He lived on Leghorn and was interested in molluscs from the early 1860s. He was a fellow of the Società Malacologica Italiana from 1874 to 1894, and published a catalogue of the molluscs living in the area of Bagni di Lucca (Uzielli in CARINA, 1866). He donated his collection of molluscs to the Museo Zoologico de "La Specola", Sezione del Museo di Storia Naturale dell'Università di Firenze in 1894 (S. Cianfanelli, personal communication, 20.10.1998).

## Nomenclature

*Oxychilus uziellii* was described by ISSEL (1872) (Issel's paper was published on May 1872; B. Bianchi Potenza personal communication, 26.11.1998) on shells collected by V. Uzielli in debris from coast near Gombo, near Pisa (Tuscany). It was later reported from several Tuscan localities by BONELLI (1873; as *Hyalina villae*), DE STEFANI (1875, 1879, 1883-84) and PAULUCCI (1879, 1880). Bonelli and Paulucci's reports were subsequently confirmed but those of De Stefani seem to be based on misidentifications.

This species was first revised by FORCART (1967) who erroneously regarded it as a junior synonym of the Corsican *Helix obscurata* Villa & Villa, 1841. It was subsequently re-examined by MANGANELLI & GIUSTI (1985) who recognized it as a well distinguished *Oxychilus* species endemic to Tuscany.

## Taxonomy

*Oxychilus uziellii* belongs to *Oxychilus* (s.str.) sensu GIUSTI & MANGANELLI (1999) sharing with the other species of this "subgenus": penis with flagellum; penial retractor inserted at apex of flagellum; internal ornamentation of penis consisting of pleats or pleats and rows of papillae; epiphallus long, usually as long as proximal penis, its internal wall with slender longitudinal





pleats; mucous gland mainly vaginal; long mesocone of central tooth. Among the *Oxychilus* (s.str.) species, it shares a narrow mid-penial portion enveloped by a thin sheath with *O. draparnaudi* (Beck, 1837), *O. mortilleti* (Pfeiffer, 1859), *O. majori* (Paulucci, 1986), *O. oglasicola* Giusti, 1968, and *O. oppressus* (Shuttleworth, 1878) (for *O. draparnaudi*, see GIUSTI & MANGANELLI, 1997: Figs. 15-30; for *O. mortilleti*, see MANGANELLI & GIUSTI, 1998: Figs. 5-17; for *O. majori*, MANGANELLI *et al.*, 1999: Figs. 4-8; for *O. oglasicola*, see MANGANELLI *et al.*, 1999: Figs. 12-14; for *O. oppressus*, personal unpublished data).

It is readily distinguished from all the other *Oxychilus* (s.str.) species by the shell shape and the internal ornamentation of the flagellum and the proximal penis. Only one other *Oxychilus* species, namely *O. denatale* (Pfeiffer, 1857) endemic to Maretime I. (Egadi Is., Sicily) and usually assigned to a monotypic subgenus, *Hyalofusca* Monterosato, 1892 (RIEDEL, 1973, 1980; GIUSTI & MANGANELLI, 1999), has a shell vaguely reminiscent of that of *O. uziellii*. This similarity was already stressed by DE STEFANI (1879, 1883-84) who claimed that they were the same species. Actually the shells of *O. denatale* and *O. uziellii* are easily distinguished by the shape of their umbilicus (small and tubular in *O. denatale*; wider and funnel-shaped in *O. uziellii*). Anatomically, the two species are distinguished by the shape of the penial complex (elongated and with a small flagellum in *O. denatale*; shorter and with a long flagellum in *O. uziellii*) and the internal ornamentation of the flagellum and the proximal penis (rows of small, vaguely polygonal papillae in *O. denatale*; a large system of transverse pleats converging towards one or two longitudinal columnar pleats opposite where the epiphallus opens into penis in *O. uziellii*; for *O. denatale*, see RIEDEL, 1973: Figs. 16-17, Pl. 2, figs. 26-31, 1980: Figs. 224-225).

The internal structure of the flagellum and the proximal penis is unique, not occurring in any other *Oxychilus* species. Usually, in fact, there is a system of small transverse pleats surrounding the epiphallus opening. If this morphological difference is related to the moment of divergence, then *O. uziellii* is an ancient species. Indeed, only one of the other *Oxychilus* species endemic or quasi-endemic to Tuscany, *O. majori* (Paulucci, 1886), has anatomical characters that diverge considerably from the usual pattern.

WESTERLUND (1887: p. 4) described a variety, *Hyalinia uziellii* var. *genei* "Pollon. in sc.", from Sardinia and ALZONA (1971) listed it as a valid Sardinian subspecies of *O. uziellii*. We have traced only one syntype, which is in the Pollonera collection at the Museo Regionale di Scienze Naturali in Turin, Italy (there is no syntypes in the Westerlund collection at the Naturhistoriska Museet in Göteborg, Sweden; T. von Proschwitz, personal communication 12.11.1998). This specimen (Fig. 12), designated as the lectotype of *H. uziellii* var. *genei*, actually belongs to *O. uziellii*. Consequently *H. uziellii* var. *genei* is a junior synonym of Issel's species. The collection locality of this specimen is uncertain (the name "Sardegna" is followed by a question mark in the original label). The fact that the abundant Sardinian material in our possession does not contain any specimen of *O. uziellii* suggests that the species has never existed in Sardinia.

## Habitat

*Oxychilus uziellii* lives in cool damp sites at 100 – 600 m of altitude in woods of evergreen and mixed sclerophylls or deciduous mesophilous broadleaves and in riparial vegetation.

## Geographical distribution

*Oxychilus uziellii* has a reduced distribution, limited to central southern Tuscany and some scattered localities of the Tuscan-Emilian Apennine and Emilian hills (Fig. 11). PANTANELLI (1879) reported it as a post-Pliocene fossil in the tufa of Colle Val d'Elsa, Staggia and Sarteano (Tuscany) and DE STEFANI (1879) described a fossil species from the post-Pliocene breccias of Monte Pisano (Tuscany), *Hyalina regnolii* De Stefani, 1879, which he regarded as related to *O. uziellii*. Since we failed to find both the voucher specimens of Pantanelli and De Stefani, their reports cannot be verified.

## Status and Conservation

Not globally threatened. *Oxychilus uziellii* has a limited distribution, but it does not seem to have declined with respect to the past or to be under any particular threat at present. So far, only one past population (that of Colle Val d'Elsa; see Historical material examined) has not been traced.

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